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THE CABBAGE HAIR-WORM.

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Not since the "kissing-bug" craze which originated in Washington, D. C., in June, 1899, and spread generally throughout the country, has there been anything like such a furore as was created by the discovery of the so-called "cabbage snake," a species of hair-worm, in the heads of cabbage in Tennessee, South Carolina, and Louisiana, in the fall of 1903. That year the cabbage-snake scare was practically confined to Tennessee and neighboring States southward. The first specimen of *Mermis albicans* Diesing (fig. 1), which is the cause of the trouble,[a] was identified from McCays, Tenn. This creature and its still somewhat mysterious occurrence in cabbage have become a matter of much perplexity and annoyance to many of our correspondents, to economic entomologists, and to chemists and physicians of the States where the Mermis most abounds. Many reports have been received from reliable correspondents of *rumors* of persons being poisoned by eating cabbage affected by this hair-worm. Some of these were gleaned from the daily press, and many clippings of the "yellow journalism" order were received. Among them were alleged reports from a physician who stated that when cabbage affected by hair-worms was eaten it produced instant death, and from a "State chemist" who made an examination of the worm and reported that it contained enough poison "to kill eight persons." In Raleigh County, W. Va., the cabbage crop was reported a complete failure, and "there was

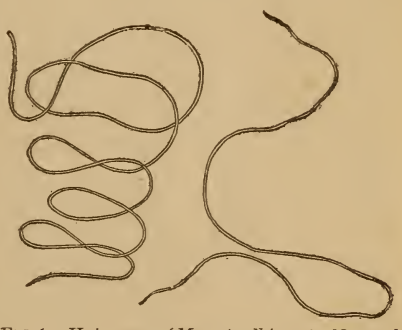

FIG. 1.—Hair-worm (*Mermis albicans*). Natural size (original).

[a] So many inquiries in regard to the identity of the creature and its alleged poisonous nature were received that a short account was furnished under the title "Hair Worms in Cabbage," in Bul. 44, of this office, pp. 93–95; and similar inquiries are being made to date of publication. During 1904, frequently five or six communications were received daily.

enough poison contained in one worm to poison 25 men." It should be unnecessary to add that none of these reports had any foundation in fact. Nevertheless the *known* presence of the hair-worm in an affected district seriously injured the demand for cabbage there, causing very considerable loss to truckers and grocers. The exaggerated reports of 1903 were not seriously considered; and it was a matter of surprise when they were reiterated the following year, and what was in reality a hoax assumed most serious proportions, not alone because of widespread alarm caused by erroneous reports of loss of life, but also because of the very material loss to cabbage growers and others who handled this commodity, and the decided extension of the area in which the hair-worm was detected. Encouraged by erroneous reports, evidently incited in many cases by unscrupulous persons, the scare soon became widespread, causing general fear of poisoning from Virginia and West Virginia southward through the same States as were affected in 1903, and into Florida, and in addition westward to Kentucky, Illinois, Iowa, Missouri, Oklahoma, and Colorado.

DESCRIPTIVE.

The cabbage hair-worm is aptly described as resembling a piece of basting thread, of the thickness of a strand of corn silk, of a darning needle, of a No. 36 or No. 40 thread, or like a horsehair; white in color; found coiled, or coiling and uncoiling; stretched at length or crawling in cabbage heads. Its length varies from 2 to 9 inches, but *reports* have been received of a creature found in the heads of cabbage measuring 9 feet! The imagination of newspaper writers as to color runs riot through "green, white, light red, olive green, and yellow."

As a matter of fact this hair-worm is filiform or thread-like, and when it attracts attention on cabbage, measures generally from 4 to 8 inches. One specimen, doubtfully of the same species, measured when uncoiled 22 inches, or nearly 2 feet. The color is white or whitish, although it sometimes has a pale brownish or greenish tinge.

THE SPECIES IDENTIFIED.

Many popular names have been bestowed upon this worm, including "cabbage snake," "snake," "snake worm," "serpent," "reptile," "cabbage rattlesnake," occasionally "cabbage worm," and seldom if ever hair-worm. Most specimens submitted for identification have proved to be what is known as *Mermis albicans* Diesing.[a] This creature is neither an insect nor a snake, but one of the hair-worms of the

[a] The studies of Diesing, Siebold, Meissner, and others have led to the expressed belief that *M. albicans* is merely the mature sexual form of *acuminata*, the latter name having priority.

order Gordiacea. The principal species of this order belong to the genera Gordius and Mermis, and were treated of somewhat at length in 1877.[a]

Mermis albicans was received during 1903 in a piece of apple, found coiled near the seed. This species is known to be parasitic on the codling moth or "apple worm" (*Carpocapsa pomonella* L.), which accounts for its presence in this instance (l. c., p. 327). It is also parasitic on certain common and destructive forms of grasshoppers, *Melanoplus spretus* Thos. or Rocky Mountain locust, *M. differentialis* Thos. or differential locust, *Schistocerca americana* Dru., and *Dissosteira carolina* L.[b]

LOSSES OCCASIONED BY RUMORS OF THE POISONOUS NATURE OF THE HAIR-WORM.

The presence of this hair-worm in cabbage and the unfortunate notoriety which has been given it, including the circulation of the merest rumors, mostly vague and uncertain, of so many persons being poisoned by eating affected cabbage, has seriously injured the money value of this vegetable very generally throughout the affected States. Although the cabbage hair-worm is not in the slightest degree deleterious to health, the credence given to the most absurd rumors which were circulated has injured cabbage for consumption and hence for sale. In parts of Illinois the fears of growers and purchasers were such that farmers were letting their cabbage go to waste. At Quinter, Kans., quantities of cabbage shipped from Colorado were reported burned because of the presence of the hair-worm. In Tennessee it was estimated that in 1904 fully 85 per cent of the cabbage crop of the State was lost—in fact, a sudden and complete suspension of the industry was actually caused. Similar reports were received from various portions of Missouri, Iowa, West Virginia, and Virginia. "In Cheatham, Smith, Franklin, Coffee, Bedford, and other counties [in Missouri] hundreds of barrels of sauerkraut were destroyed through fear that the dreaded snake might be a part of the ingredients." At Columbia, Mo., hundreds of dollars' worth of cabbage was lost. Many gardeners claimed that they could not sell a single head on account of the "snake scare."

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[a] First report of the U. S. Entomological Commission, published in 1877 (pp. 326–334). The hosts of hair-worms include many Orthoptera (grasshoppers or locusts, crickets, and katydids). They are sometimes parasitic on beetles, more particularly Carabidæ or ground beetles, on bees and flies, on caterpillars of butterflies and moths, and even on snails.

[b] The classification and habits of Mermis have not been given much study, hence some slight doubt exists as to the species of Mermis observed in the case of some of the hosts cited, but if one species will affect both lepidopterous larvæ and grasshoppers, this is evidence of its not being overparticular as to its host.

ALLEGED SICKNESS AND DEATH CAUSED BY HAIR-WORMS.

The general impression in regard to the poisonous nature of the cabbage hair-worm has been mentioned, yet considerable differences of opinion prevail. To repeat alleged deaths and poisonings in detail might have the opposite effect from that for which this circular was prepared. Stories were circulated of whole families being poisoned by eating cabbage affected with the hair-worm, sometimes with the reservation that no one knew *personally* of their truth, and that many cases were traced to their source and found to be utterly without foundation. From Tennessee came a report of the death in one town of a man, woman, and six children. In portions of the same and in other States persons were stated to have been taken ill with pain and vomiting after having eaten cabbage on which the worms were subsequently found. Possibly the consumers had been seized with temporary hysteria, imagining that they had unconsciously eaten many individuals, hence the symptoms. Others were reported severely poisoned or dead. In most cases exact localities were furnished, but names were wanting. In some cases domestic animals were said to have been poisoned; in others cabbage was fed to them without any ill results.

The death of a man and wife and their four children in an Illinois town after eating snake-worm infested cabbage was reported in several newspapers and the family name mentioned:

> The entire family of six ate the cabbage at supper and died during the night. A cabbage in the garden was examined and found to contain worms the size of a thread, 8 or 10 inches long and about the color of the cabbage. The cabbage was cut up and fed to animals, and all died. Farmers are destroying all their cabbage. Three persons in the neighborhood have recently died after eating cabbage.

In response to inquiry from this office the postmaster of this town, the name of which is omitted for obvious reasons, wrote December 17, 1904, that efforts were made to locate the origin of the account, but without success.

LIFE HISTORY.

The hair-worms of the genus Mermis develop within the body of their host and, according to various writers, when about full grown desert it by rupturing the body wall. These individuals are undeveloped sexually, and characterized by a mouth consisting of a minute aperture, and a minute anal point which is generally curved. On issuing from the host the worm bores into the earth and conceals itself. During this stage in the soil no food is taken, though several months may elapse, the creature hibernating and becoming sexually mature before copulation takes place in the spring. The sexes unite in knots, and the female deposits numerous eggs[a] in the ground. Here the

[a] It might be added that hair-worms positively do not develop from horsehairs.

young, which are thread-like like their parents, hatch and burrow upward to the surface, and enter as parasites the bodies of caterpillars and various soft insects, such as are found under leaves and other débris near the ground.

The habits of Mermis in Europe have given rise to the belief in a rain of worms. Not infrequently in summer time, after a warm rain at night, swarms of these hair-worms appear on the surface of the earth, whence the supposition that they are rained down.

OTHER WORMS, INSECTS, ETC., MISTAKEN FOR THE CABBAGE WORM.

Numbers of hair-worms other than *Mermis albicans*—the larvæ of mycetophilid flies, and some species of myriopods, as also angleworms—have been received as undoubted cabbage snakes or as suspects. In fact, gullible people throughout the affected region have literally gone "hunting for trouble," and have sent everything conceivable except the true cabbage worms (caterpillars of moths and butterflies), which are altogether too well known, as suspected "cabbage snakes." Some of these—all, with the possible exception of the myriopods and mycetophilids, of accidental occurrence on cabbage—will be mentioned.

Mermis spp.—Several species of Mermis, related to *albicans* but differing in various particulars, have been received with the usual reports of poisonousness. One species of hair-worm, resembling the "cabbage snake" and possibly the same species, was received from St. Clara, W. Va., in March, 1905, which measured nearly 2 feet in length (22 inches) when uncoiled.

Paragordius varius, a suspect, was not found in cabbage but in water "without visible means of support," in Virginia.

Geophilus spp.—Numbers of myriopods of the order Chilopoda, which includes the centipedes and millipedes, were among this number, nearly all belonging to the genus Geophilus. There appear to be no positive records of the infliction of serious injury to man by any forms of these creatures found in the United States, but certain tropical forms are decidedly venomous. These creatures sometimes attack man, if accidentally handled, but they are not known to occur in cabbage. The poisonous species are large and conspicuous, and therefore not likely to be eaten with food. The species of this genus have carnivorous habits, and there is a possibility that they may destroy some forms of cabbage worms and hence may be beneficial.

Earthworms.—Specimens of earthworms, in such bad condition that identification was impossible, were received from West Virginia and Ohio, where they were mistaken for the cabbage hair-worm.

Mycetophilids.—The larvæ of mycetophilid flies were received in several instances, from August until October, 1904, chiefly from Tennessee, Virginia, and South Carolina. A correspondent at Duffield, Va., pronounced these maggots poisonous, and said that death had resulted from the use of cooked cabbage in which they had been found. A correspondent at Yokum, Ky., made a similar report.

HAIR-WORMS POSITIVELY NOT POISONOUS.

In spite of repeated published and written statements that the so-called cabbage snake is not poisonous, this fact has not been given

very general credence, hence the matter is still imperfectly understood by many. As it is an established fact that none of the hair-worms possesses poisonous properties, it was not considered necessary to make any analyses or experiments at this Department to demonstrate their nontoxic quality. However, Dr. Louis Leroy, Nashville, Tenn., who corresponded with this office on this topic during August and September, 1904, undertook to demonstrate beyond peradventure of doubt that the hair-worm could not possibly cause harm to persons eating it or cabbage on which it had occurred, and, although he has already published on the subject, it may be well, for the benefit of skeptics, to repeat in substance his conclusions:

During September he wrote that he had carried on a thorough investigation of the alleged poisonous nature of this hair-worm, and found absolutely nothing toxic connected with it, either when eaten raw or when cooked, or on cabbage on which the creature had lived. Efforts to trace every reported case of poisoning in Tennessee resulted in ascertaining that they were all without foundation; no authentic case could be cited; and finally, he says "I am at a loss to understand how such reports could gain credence and ever be published for facts in the daily press." In order to determine whether or not the hair-worm had any poisonous qualities he instituted a series of experiments, using rabbits, guinea pigs, cats, dogs, horses, and cows, finding that they could all eat the worms, raw or cooked, with impunity. Extracts from the hair-worms prepared with various solvents were also found to be entirely innocuous, administered internally (per orem) and injected hypodermically.

"Believing that possibly these worms might cause decomposition or fermentation in the cabbage, with the production of poisonous substances, the result of the decomposition," he allowed samples of cabbage, both raw and cooked, to decompose with the worms, and then tested the decomposed material for poisonous properties as above, and in no case was any toxic substance obtained. Chemical analyses of the worms and the products of decomposition mentioned were made, and he was unable to find any ptomaine or other isolatable substance of a toxic nature.

As a result the conclusion was reached "that the cabbage snake is entirely harmless, and that public rumors and superstitions are fallacies without semblance of foundation."

Approved:

JAMES WILSON,
Secretary of Agriculture.

WASHINGTON, D. C., *June 10, 1908.*

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